LESNIK, A.G.

Fine structure of the X-ray absorption edge at longer wavelengths. Nauk. zap. Kiev. un. 9 no.2:71-77 '50. (MLRA 9:12)

(X-ray spectroscopy)

LESNIK, A.G.

Directed valencies in molecules with ordinary covalent bonds.
Nauk. zap. Kiev. un. 9 no.2:79-99 '50. (MLRA 9:12)

(Valence (Theoretical chemistry))

LESNIK, A.G.

Patterns of closely ordered arrangements of alloys with additional ionic bonds. Sbor. nauch. rab. Lab. metallofiz. no.5:104-117 '54. (MLRA 8:9)
(Metallography) (Alloys)

LESNIK, A.G.

18.

The effect of annealing at 1200° on the energy of activation of diffusion of chromium in ferrochromium alloys. A. G. Lesnik. Sbornik Nauch. Rabot Lab. Metallog. Akad. Nauk Ukr. S.S.R. 1954, No. 5, 118-22; Referat. Zhur. Met. 1956, No. 6642.—The coeff. of diffusion of Cr in Fe-Cr contg. 0.04-0.065% C and 4.04-24.2% Cr, at 920-1120°, was detd. on foils 10-30 μ thick, by the method of evapn. in vacuo. The energy of activation of diffusion $E_a$ for austenitic alloy (4.04-10.56% Cr) is related to time of annealing t by $(E_a(\infty) - E_a(t))/(E_a(\infty) - E_a(0)) = e^{-\alpha t}$, where α depends on the compn. of the alloy and the temp. of annealing. Thus with increasing t, the lattice is strengthened.

Alexis N. Pestoff

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4E2c

Lesnik, A. G.

18 18 18

Microstructure of iron-chromium alloys annealed for different time at 1200°. A. G. Lesnik and N. P. Plotnikova. *Sborn. Nauch. Rabot Lab. Metallov. Akad. Nauk Ukr. S.S.R.*, 1954, No. 5, 123-7; *Referat. Zhur., Met.* 1956, Abstr. No. 7900.—Fe-Cr alloys contg. 24.2 and 36% Cr and ≤0.0.% C were tempered in sealed quartz ampuls at 1200°. In cast alloys the σ-phase was not detected. In the alloy contg. 24% Cr after 5 hrs. at 760°, the σ-phase appeared. At 1200°, the σ-phase ppid. in all samples, and increased in amt. with increase of tempering time. At first the σ-phase was formed; after some time this was transformed into the harder σ-phase. The two phases have the same compn., but differ in their phys. properties. The hardness of the σ-phase depends on thermal treatment of the alloy. The transformation $\sigma' \rightarrow \sigma$ is very rapid.

A. N. Pestov

Distr: 4E26/4F1

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1 11

LESNIK, A. O.

"Laws Governing the Ordering of Metal Alloys With a Supplementary Ionic Bond." Dr Phys-Math Sci, Laboratory of Metallophysics, Acad Sci Ukrainian SSR, Kiev, 1954. (KL, No 3, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)
SO: Sum. No. 556, 24 Jun 55

LESNIK, Andrey Gerasimovich

LESNIK, Andrey Gerasimovich - Academic degree of Doctor of Physico-Mathematical Sciences, based on his defense, 26 February 1965, in the Council of the Inst of Mathematics and Physics, Acad Sci USSR, of his dissertation entitled: "On the Regularity of the Regulation of Metallic Alloys with Complementary Ionic Bond." for the Academic Degree of Doctor of Sciences

SO: Byulleten' Ministerstva Vysshego Obrazovaniya SSSR, List No. 3, February 1966 Decisions of the Higher Certification Commission Concerning Academic Degrees and Titles.

JPRS/NY 564

LESNIK, A. G.

"X-Ray Investigation of the Effect of Annealing at 1,2000° C on the Structure of Fe-Cr Alloys"

an article in the book "Questions on the Physics of Metals and Metal Science", AS Ukr SSR, Kiev, 1955, 151 pp.

So; Sum. No. 1102, 19 Oct 56

LESNIK, A. G.

6
4E2c

X-ray investigation of the effect of annealing at 1200° on the structure of iron-chromium alloys. A. G. Lesnik, *Voprosy Fiz. Metal i Metalloved., Akad. Nauk Ukr. S.S.R. Sbornik Nauch. Rabot* 1955, No. 6, 103-6; cf. *ibid.* No. 8, (1954).—X-ray analysis of cylinders (0.4–0.5 mm.) filed out from the alloys (25 and 35% Cr) previously investigated (*loc. cit.*) showed that annealing at 1200° for different periods did not affect the crystn. parameters more than ~ 0.001 kX. On the other hand, lines not present in the α-alloys were detected. These lines were also present in the Debyegrams of ferrite-free powders obtained by the electrolysis of the alloys in *N* HCl contg. 1% hyposulfite against a graphite cathode. The structure of the lattice is apparently not affected by the duration of annealing. However, the Bragg's angle is shifted towards smaller values as the duration of annealing increases. This accounts for the compression of the lattice and the increased strength accord. with annealing. — I. Rencoviz

USSR/Solid State Physics - Diffusion, Sintering, E-6

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34768

Author: Lesnik, A. G., Nekrashevich, P. I., Sirik, V.

Institution: None

Title: Diffusion of Nitrogen in Steels Alloyed with Chromium and Manganese

Original Periodical: Nauk. zap. Kiivs'k. un-tu, 1955, 14, No 8, 125-126

Abstract: Evaporation in vacuum was used to investigate diffusion of nitrogen in iron-chromium alloys (4.71% chromium) and iron-manganese (2.21% manganese). Plates 100-800 mu thick were made of the alloys. The nitriding of the plates of the alloy was carried out in a stream ammonia in 2 stages: at 650° for 30 hours, and at 750° until a concentration of nitrogen of 10-11% by volume was obtained in the plate. With this, the activation energy of the diffusion of nitrogen in the iron-chromium-nitrogen alloy was found to be $E_a$ = 70 kcal/mol, and in the iron-manganese-nitrogen it was found to be $E_a$ = 15 kcal/mol. For the diffusion of nitrogen in pure iron, $E_a$ is 23 kcal/mol. This difference in the activation energies is used by the authors to explain the high strength of the nitrided layer of steel alloyed with chromium and manganese.

LESNIK, A. G.

**The theory of polymerization of iron.** V. N. Svechnikov and A. G. Lesnik. *Fiz. Metal. i Metalloved.* 3, 87-98 (1956).—Considering solid soln. of Fe in α as ideal soln. in the gamma loop as ideal soln. in the first approx. [illegible] shown that the equil. curve $\gamma/(\gamma + \alpha)$ can be expressed in many cases as a second degree curve. [illegible] sis of the deviations of the alloys under consideration from the ideal ones permitted establishing more accurate equil. conditions between γ and α phases indicating that under certain conditions it is possible to have a min. on the equil. curves $\gamma/(\gamma + \alpha)$ and $(\gamma + \alpha)/\alpha$. From the equation thus derived, the phase equil. curve for the Fe-Cr system was plotted which checked well the expti. data of many workers.

L. D. Gat

SOV/137-57-6-107

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 6, p 195 (USSR)

AUTHORS: Plotnikova, N.P., Lesnik, A.G.

TITLE: The Influence of Long-term High-temperature Annealing on the Kinetics of the Polymorphic $\gamma \rightarrow \alpha$ Transformation in Ferrochrome Alloys (Vliyaniye dlitel'nogo vysokotemperaturnogo otzhiga na kinetiku polimorfnogo $\gamma \rightarrow \alpha$-prevrashcheniya v zhelezokhromistykh splavakh)

PERIODICAL: Sb. nauch. rabot In-ta metallofiz. AN UkrSSR, 1956, Nr 7, pp 88-94

ABSTRACT: The kinetics of the isothermic $\gamma \rightarrow \alpha$ transformation (T) upon tempering in the 560-660°C interval in alloys containing 5.82, 8.25 and 10.11% Cr after preannealing (PA) at 1150-1200° with holding for up to 180 hours is investigated by measurement of electrical resistivity (R). All the kinetic curves of variation in E may be expressed by the equation $y = y_0 [1-\exp(-(\alpha t)^b)]$, where $y_0$ is the overall change in R with complete T, y is the change in R at the moment in time t, and b = 1.8-2.0. On the assumption that $\alpha = \exp(-E/RT)$, where E is the energy of activation of the T, a curve for the relation of log t to 1/T

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The Influence of Long-term High-temperature Annealing (cont.)

may be employed to determine E. It is found that long PA increases the time required for complete T and E. The value of E and its increase are the larger, the greater the amount of Cr in the alloy. Charge in E is analogous to change in the energy of activation of Cr diffusion and is explained by hardening of the lattice in connection with the appearance of the short-range order due to long PA. E does not correspond to the energy of activation of Cr diffusion, as $\gamma \rightarrow \alpha$ T is not diffusive.

L.V.

Card 2/2

137-58-6-13284

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 302 (USSR)

AUTHORS: Lesnik, A.G., Khar'kova, G.V., Ostrovskaya, T.S.

TITLE: Effect of High-temperature Heating on Nichrome Properties (Vliyaniye vysokotemperaturnogo nagreva na svoystva nikhromov)

PERIODICAL: Sb. nauchn. rabot In-ta metallofiz. AN UkrSSR, 1957, Nr 8, pp 70-76

ABSTRACT: An investigation of the effect of prolonged high-temperature heating on the microstructure, hardness, and parameters of the lattice of three different nichromes: Ni-Cr (24.85% Cr), Ni-Cr-Mo (Cr 19%, Mo 1.77%), and Ni-Cr-W (Cr 22.0%, W 3.3%). Specimens were heated in sealed quartz ampoules at 1170-1200°C. It was established that high-temperature heating of nichromes and subsequent holding within the temperature range between 600 and 840° causes a change in the parameter of the lattice of the initial solid solution, which indicates its decomposition. This phenomenon has no connection with the presence of incidental impurities. Nichromes containing > 20% Cr are not completely balanced systems, and a prolonged heating at high temperatures causes their transition into a balanced condition. N.K.

Card 1/1

1. Nickel alloys--Temperature factors 2. Nickel alloys--Test results

AUTHOR: Lesnik, A. G. 20-119-5-38/59

TITLE: The Metastable Phase Diagram of the Iron-Chromium System (Metastabil'naya diagramma sostoyaniya sistemy zhelezo-khrom)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 5, pp. 978-981 (USSR)

ABSTRACT: The present report supplies a numerical estimation of the energy of interatomic interaction in iron-chromium alloys with using the results by V. N. Svechnikov and A. G. Lesnik (Ref. 1) as well as the experiments for the determination of the position of the curves of the phase equilibrium $\alpha$ - $\gamma$ in this system which had been carried out especially for this purpose. The equation for the curves of the equilibrium of $\alpha$- and $\gamma$-phases are put down and explained. The one of these equations makes possible the explanation of the existence of a minimum on the curves for the equilibrium of the $\alpha$- and $\gamma$-phases of some systems, especially for the system Fe-Cr. The author found the following: A previous "homogenizing" annealing of the alloys can

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strongly displace the curve of equilibrium which fact obviously is connected with the establishment of a near order in the sample exposed to prolonged heating. The author made other experiments for the determination of the position of the curves of equilibrium of the α- and γ -phases in the Fe-Cr* system. Electrolytical chromium refined in an hydrogen current as well as electrolytical iron served as basic material. A diagram shows the obtained curves for the beginning as well as for the end of the $\alpha \rightarrow \gamma$-transformation of the alloys investigated. According to the data determined the minimum temperature $T_{min}$ = 830°C. The values resulting from the solution of the equations given in the beginning are mentioned. Both phases obviously belong to the decomposing solid solutions of the Bekker's type. In reality only a decomposition of the α-phase must be observed as the γ -phase exists only within a very limited interval of concentration. The data obtained make possible the understanding of the so-called 475°C-brittleness. In the state of equilibrium of the investigated solutions a near order must occur in which the atoms of

different name avoid each other and where every atom wants to be surrounded by identical atoms. The chromium-ferrite, however, decomposes in the state of equilibrium, separating a metallic compound. This contradiction speaks in favor of the fact that in the Fe-Cr system the interatomic interaction can in no case be completely explained by the parameters of the interatomic interaction described in this paper.
There are 2 figures and 5 references, 3 of which are Soviet.

ASSOCIATION: Institut metallofiziki Akademii nauk USSR
(Institute of Metal Physics, AS Ukrainian SSR)

PRESENTED: December 7, 1957, by G. V. Kurdyumov, Member, Academy of Sciences, USSR
SUBMITTED: December 2, 1957

Card 2/3

13(5)
AUTHOR: Lesnik, A. G. SOV/[illegible]

TITLE: **Interaction Between Atoms in Iron - Chromium Alloys**
(Vzaimodeystviye v splavakh sistemy zhelezo-khrom)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr [illegible], p. [illegible] (USSR)

ABSTRACT: This paper shows by the example of a Fe-Cr system that the use of the hypothesis of the formation of a polar state of atoms in alloys gives the possibility to understand the main peculiarities of the decomposition of solid solutions with separation of an intermetallic compound of the σ-phase type of variable composition. The simplest variant of this hypothesis includes the following assumptions: 1) From the zone which is common for the atoms of the sort B, a certain number of electrons passes over to the zone which is common for the atoms of the sort A. Any atom of the sort B, therefore, receives a positive excess charge νe, and any atom of the sort A receives the negative charge -δe. A purely Coulomb (Kulon) interaction (in addition to a metallic interaction) occurs between the

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atoms in the alloy: $\varepsilon^*_{AA} = \varepsilon_{AA} + q_{AA}$; $\varepsilon^*_{AB} = \varepsilon_{AB} + q_{AB}$; $\varepsilon^*_{BB} = \varepsilon_{BB} + q_{BB}$. $q_{AA}$, $q_{AB}$, and $q_{BB}$ are the additional energies of the Coulomb interaction between the corresponding atom pairs; $\varepsilon_{AA}$, $\varepsilon_{AB}$, and $\varepsilon_{BB}$ are the energies of the atom pairs of all the other interaction types. It is assumed that these energies do not depend on the composition of the alloy. 2) The energy of the mixture consists of 2 parts: of the configuration energy and of the energy R necessary for the transition of the electrons from the atoms of the sort B to the atoms of the sort A. For the investigation of the Coulomb component of the configuration energy, the shielding of the field of the ionic charges by the conduction electrons has to be taken into account. Because of this shielding, the interaction force between the ions decreases with the distance according to an exponential law. The consideration of the interaction of the nearest neighbors, therefore, is sufficient for the calculation of the alloy energy. The true charge of the ions may be replaced by effective charges. It is assumed that the effect of the shielding does not depend on the compo-

**Interaction Between Atoms in Iron - Chromium Alloys**

sition of the alloy. The author then deduces an expression for the free energy of the system. The configuration energy is calculated in an approximation which takes into account the interaction of the nearest neighbors in the alloy lattice. The entropy is considered in the quasichemical approximation. The calculation is discussed step by step. A figure shows the diagrams of the free energy of the system as a function of the composition for 700° and 900°. An other figure shows the theoretical and the experimental phase diagrams of the system Fe-Cr. The third diagram shows the dependence of the mixture heat on the composition for the temperatures 900° and 800° and also for a sufficiently high temperature for which the closest order may be neglected. There are 3 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Institut metallofiziki Akademii nauk USSR
(Institute of Metal Physics of the UkrSSR)

PRESENTED: May 19, 1958, by G. V. Kurdyumov, Academician

Card 3/4

LESNIK, A.G.; KHAR'KOVA, G.V.

Displacement of the equilibrium curves of and phases in the Fe - Cr system as a result of prolonged heating of the phase. Sbor. nauch. rab. Inst. metallofiz. AN URSR no.9:133-138 '59. (MIRA 12:9)

(Phase rule and equilibrium)
(Metals at high temperature)

LESNIK, A.G. [Lisnyk, A.H.]; SKVORCHUK, V.P.

Application of the theory of regular solutions to an analysis of the alpha gamma equilibrium curves and the fusibility curves of iron - aluminum, iron -vanadium, and iron - molybdenum systems. Dop.AN URSR no.10:1408-1412 '60. (MIRA 13:11)

1. Institut metallofiziki AN USSR. Predstavleno akademikom AB USSR V.N.Svechnikovym.
(Phase rule and equilibrium) (Iron alloys)

18.1500

32029
S/601/60/000/011/001/014
D207/D304

AUTHOR: Lesnik, A. G.

TITLE: Thermodynamic properties of Fe-Cr alloys

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzyky. Sbornik nauchnykh rabot. no. 11. 1960. Voprosy fiziki metallov i metallovedeniya, 3-21

TEXT: The author reviews published work, including his own, on phase transformations in Fe-Cr alloys and compares the results with his statistical theory. This theory deals with precipitation of an intermetallic compound of variable composition (the $\delta$-phase) in the $\alpha$-phase of Fe-Cr alloys. The following main assumptions are made: (1) Regions rich in Fe atoms lose electrons to Cr-rich regions, and this introduces the Coulomb interaction, in addition to the metal-type (pair) interaction between atoms; (2) the heat of mixing consists of the usual configuration

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energy and the work (R) necessary for transfer of electrons from Fe to Cr atoms; (3) ion charges are screened by conduction electrons, and, therefore, the interaction between ions decreases exponentially with distance; (4) the pair interaction energies, the work R, and the screening effect are independent of the alloy composition. The theory (dashed curves in Fig. 3) yields good agreement with the experimental equilibrium phase diagram given by continuous curves of Fig. 3. The theory does not contradict the approximation of "regular solutions" given by V. N. Svechnikov and A. G. Lesnik (Ref. 21: Sbornik "Fizika metallov i metallovedeniye" III, no. 1, 88-96, 1956). Moreover, the theory explains the observed embrittlement ("475° embrittlement") and hardening of Fe-Cr alloys on prolonged heating at 475°C; this effect is due to metastable decomposition of the $\alpha$-phase. Finally, although the theory assumes transfer of electrons from Fe to Cr atoms, it is equally valid if electrons are transferred from Cr to Fe. There are 9 figures and 31 references: 14 Soviet-bloc and 17 non-Soviet-bloc. The 4 most recent references to the English-

Thermodynamic properties...

language publications read as follows: H. Martens, P. Duwez, J. of Metals, 8, no. 4, 614, 1956; R. O. Williams, H. W. Paxton, J. Iron and Steel Inst., 185, part 3, 358, 1957; N. F. Mott, Phil. Mag., 2, no. 23, 1364, 1957; R. S. Weis, J. S. DeMarco, Rev. of Modern Phys., 30, 59, 1958.

SUBMITTED: September 7, 1959

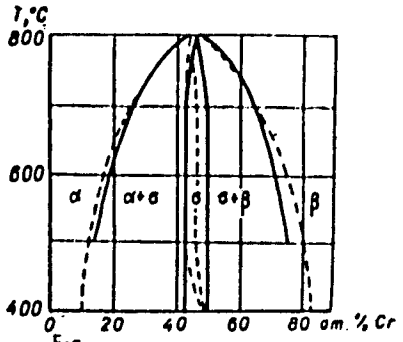


Fig. 3. Equilibrium phase diagram of the Fe-Cr system: am.% Cr - atomic % Cr

Рис. 3. Равновесная диаграмма состояния системы Fe—Cr.

Card 3/3

LESNIK, Andrey Gerasimovich; GUROV, K.P., red.; PLAKSHE, L.Yu., tekhn. red.

[Models of interatomic interaction in the statistical theory of alloys] Modeli mezhatomnogo vzaimodeistviia v statisticheskoi teorii splavov. Moskva, Fizmatgiz, 1962. 98 p. (MIRA 15:7)

(Crystal lattices--Models)
(Alloys--Metallography)

LESNIK, A.G.; SKVORCHUK, V.P.

Using the theory of normal solutions for the analysis of phase equilibrium curves in the system Fe - Co. Sbor.nauch.rab.Inst. metallofiz.AN URSR no.12:102-110 '61. (MIRA 14:8)
(Phase rule and equilibrium) (Iron-cobalt alloys)

S/601/62/000/016/008/029
E039/E420

AUTHORS: Lesnik, A.G., Pushkar', V.N.

TITLE: On certain types of magnetic structure observed by the magneto-optical method with magnetic reversal of permalloy films in a static field

SOURCE: : Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzyky. Sbornik nauchnykh rabot. no.16. Kiev, 1962. Voprosy fiziki metallov i metallovedeniya. 59-62

TEXT: Films of alloy 82.5% Ni and 17.5% wt. Fe were evaporated at 1 to 3 x $10^{-5}$ mm Hg on to a polished glass base coated with silicon monoxide. The temperature of the glass was 250 to 300°C and a constant field of 100 Oe was maintained in the plane of the film during deposition. The domain structure was studied by a magneto-optical method, assembled on the base of a МИМ-8 (MIM-8) microscope. The structures observed can be divided into four groups: 1st Group. With fields of $H \leqslant H_o$ and with magnetization in the difficult direction the hysteresis loop is a straight line. When $H \geqslant H_o$ the line expands and a narrow loop is formed. When a certain critical field $H_k$ is attained and then removed the

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On certain types of magnetic ...

previous domain structure is not recovered. Usually $H \leqslant H_k$. 2nd Group. With magnetization along the easy direction the domain structure is the same as in the 1st group, but with magnetization in the difficult direction the domain structure is different. After removing the magnetizing field $H \gg H_o$ the domain structure does not recover and light and dark domains appear with regions extending at 45° to direction of easy magnetization. Their behavior is complex. 3rd Group. These films have rather wide and nonrectangular hysteresis loops which are similar for magnetization in the easy and difficult directions. Magnetization in both directions is produced by a displacement of the domain boundary. The domain structure is very complex and nonuniform especially with magnetization in the difficult direction. 4th Group. These films have a critical thickness characterized by a particular form of hysteresis loop with a large coercive force. The structure of films in the group will be discussed in a separate article. The peculiarities of these different types of film are undoubtedly connected with their structure but at the

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S/601/62/000/016/008/029
On certain types of magnetic ... E039/E420

present time there is no theory which is able to explain all the noted regularities. There are 5 figures.

SUBMITTED: January 22, 1962

Card 3/3

LESNIK, A.G. [Lisnyk, A.H.]

Nature of magnetic anisotropy in ferromagnetic films. Ukr.fiz. zhur. 7 no.4:443-444 Ap '62. (MIRA 15:8)

1. Institut metallofiziki AN UkrSSR, g. Kiyev.
(Ferromagnetism)

LESNIK, A.G.; PUSHKAR', V.N.

Certain types of magnetic structure observed by magnetooptical methods during the remagnetization of permalloy films in a static field. Sbor. nauch. rab. Inst.metallofiz. AN URSR no.16:59-62 '62. (MIRA 16:5)

(Magnetooptics) (Permalloys--Magnetic properties)

S/126/63/015/002/003/033
E039/E420

AUTHOR: Lesnik, A.G.

TITLE: The hysteresis loops of films with a planar a.c. voltage

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.2, 1963, 175-180

TEXT: Calculations are made on hysteresis loops of films in the plane of which an isotropic alternating microvoltage is acting. Comparison is made with hysteresis loops obtained from the alloy 17% Fe, 83% Ni, purity 99.99%, evaporated at $10^{-5}$ mm Hg on to glass at 250 to 300°C. A constant magnetic field of 100 Oe was maintained in the plane of the films during deposition. Rate of deposition was 20 Å/sec and thickness about 2500 Å. These films have a comparatively large coercive force $H_c$ (10 to 30 Oe) and a large saturation field $H_s$ exceeding $H_c$ by a factor of 2 to 3. The voltage gradient at the boundary of the microdomains is assumed to be so large that mixing processes are completely retarded and reversal of magnetization in the film is accomplished by the rotation of the magnetization vector in separate micro-domains. The theory developed satisfactorily explains the

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experimental results. In a more general theory the effect of the difference in thermal expansion of the film and backing is taken into account, but this does not introduce any significant change. In the more accurate theory it was necessary to take fully into account the structure of the films. In some cases this can have a decisive effect on the form of the hysteresis loop. There are 3 figures.

ASSOCIATION: Institut metallofiziki AN USSR
(Institute of Physics of Metals AS UkrSSR)

SUBMITTED: June 21, 1962

Card 2/2

LESNIK, A.G.

Roughness of sublayer surfaces and the coercive force of films. Sbor. nauch. rab. Inst. metallofiz. AN URSR no.18: 178-182 '64 (MIRA 17:3)

LESNIK, A.G.; PUSHKAR', V.N.

Incoherent spin in film[illegible] with a poorly expressed [illegible]. Sbor. nauch. trud. Inst. metallofiz. AN [illegible] no.[illegible] [illegible]. (MIRA [illegible])

L 41561-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG
ACCESSION NR: AT5008878 S/2601/64/000/020/0185/0190

AUTHOR: Yepifanov, V. G.; Lesnik, A. G. (Doctor of physico-mathematical sciences)

TITLE: Zone melting of metal in water-cooled copper crucibles

SOURCE: AN UkrSSR. Institut metallofiziki. Sbornik nauchnykh trudov, no. 20, 1964. Voprosy fiziki metallov i metallovedeniya (Problems in the physics of metals and physical metallurgy), 185-190

TOPIC TAGS: zone melting, metal zone melting, reactive metal zone melting, chromium zone melting, titanium zone melting, manganese zone melting, zone refining

ABSTRACT: Several variants of zone-melting units and various methods of zone melting reactive metals have been tested. Tests showed that the unit for vertical induction-zone melting of metals in a copper crucible consisting of water-cooled tubes is the most convenient and effective. The number of tubes depends upon the size of the crucible and has to be increased in a large crucible in order to reduce the loss of magnetic flux. The quality of chromium ingots,

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ACCESSION NR: AT5008878

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20—35 mm in diameter and 200 mm long, melted in this type of unit was superior to that of ingots obtained by arc melting. It was proved possible to use the unit for melting and refining titanium, vanadium, and manganese to obtain good quality ingots. The unit makes it possible to degas the charge in vacuum before melting at temperatures up to 800C and to control the melting process visually. Single-pass zone melting lowers the NDT temperature of chromium by 100C, as compared with that of conventionally melted chromium. Chromium ductility is further improved by increasing the number of zone passes. Orig. art. has: 5 figures and 2 tables. [ND]

ASSOCIATION: Institut metallofiziki, AN UKrSSR (Institute of Metal Physics, AN UKrSSR)

SUBMITTED: 20Apr64 ENCL: 00 SUB CODE: MM, IE

NO REF SOV: 001 OTHER: 003 ATD PRESS: 3234

Card 2/2

L 50966-65 EWT(l)/EPA(s)-2/EWT(m)/EWP(i)/T/EWP(t)/EEC(b)-2/EWP(b) Pt-7/Pi-4
IJP(c) JD/GG

ACCESSION NR: AP5011429 UR/0048/65/029/004/0555/0556

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B

AUTHOR: Lesnik, A.G.; Pushkar', V.N.

TITLE: Dependence of the limit of reversible rotation on the "dispersion" of the anisotropy field in magnitude and direction /Report, Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held in Irkutsk, 10-15 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 4, 1965, 555-556

TOPIC TAGS: magnetic anisotropy, ferromagnetic thin film, magnetic property

ABSTRACT: According to theory the reversal loop of a magnetically uniaxial film should be anhysteretic in the hard direction. Actual films, however, exhibit loops of varying width down to a certain critical field $H_0$, called the limit of reversible rotation. Attempts to correlate the value of $H_0$ with the maximum dispersion angle (R.W.Olmen and S.M.Rubens, J. App. Phys., 33, Suppl. to No. 3, 1107, 1962) yielded negative results. The present authors attribute this to failure to take into account dispersion of $H_k$ (the anisotropy field) in magnitude. Using an adduced formula and experimental values of the dispersion of $H_k$ in angle and magnitude, the authors calculated $H_0$ for a series of ferromagnetic films and plotted these against the direct

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ACCESSION NR: AP5011429

values of $H_o$ measured with a ferrotester. The resultant plot is virtually a straight line with a slope of 45°. Which proves the validity of the adduced formula and the authors' hypothesis that the limit of reversible rotation depends on the dispersion of the anisotropy field in both direction and magnitude. It is suggested that the ratio $H_o/H_k$ can be used as a general measure of the deviation of a ferromagnetic film from ideal. Orig. art. has: 1 formula and 1 figure.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: EM, EC

NR REF SOV: 001 OTHER: 002

Card 2/2

L 50963-65 EWT(1)/EPA(s)-2/EWT(m)/EWP(1)/EWA(d)/T/EWP(t)/EEC(b)-2/EWP(z)/EWP(b)
ACCESSION NR: AP5011431 Pt-7/Pi-4 IJP(c) JD/GG UR/0048/65/029/004/0560/0567

AUTHOR: Lesnik, A.G.; Levin, G.I.

TITLE: Measurement of the magnetic characteristics of Permalloy films by the resonance absorption method /Report, Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held in Irkutsk, 10-15 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 4, 1965, 560-567

TOPIC TAGS: ferromagnetic thin film, permalloy, magnetic anisotropy, magnetic property, resonance absorption

ABSTRACT: It has been shown by T.D.Rossing (J. Appl. Phys. 34, Part 2, 995, 1963) that the width of the resonance absorption curve $\Delta H$ of a ferromagnetic film is a linear function of the excitation field frequency, i.e., that $\Delta H = \Delta H_0 + \beta\omega$, where $\omega$ is the excitation frequency, $\beta$ is a frequency independent parameter and $\Delta H_0$ is the so-called residual width, which depends on inhomogeneities of the film properties, specifically on the dispersion of the anisotropy field in magnitude and angle. In the megacycle frequency range (and lower) the relaxation width should be small compared with the residual width. This offers the possibility of employing

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L 50903-65

ACCESSION NR: AP5011431

resonance absorption in this region to obtain data on the properties of ferromagnetic films. The purposes of the present work, accordingly, were to analyze this possibility and to test it in practice. It is assumed that each microregion with a specific magnitude and direction of $H_k$ participates independently in the resonance. It is also assumed that in experiments one can distinguish between the contributions to the residual line width due to different factors, namely, absorption by microdomains in which the magnetization vectors are in a metastable position, fragmentation of the film into domains, and the effect of pores, nonmagnetic inclusions and structural defects. The equipment for the experimental part of the work was similar to that described by T.E.Hasty and L.J.Bondreaux (J. Appl. Phys., 32, 1807, 1961) and consisted essentially of an rf oscillator and a coil to provide the magnetizing field. Some $H_k$ distribution curves are reproduced. The shifting of the curves under the influence of various factors is discussed. It is concluded that provided certain conditions are fulfilled the resonance absorption technique can be used to determine the mean value of the anisotropy field, the dispersion of $H_k$ in magnitude and direction, and the value of the coercive force. The requisite conditions are a sufficiently small amplitude of the exciting field and - for obtaining the dispersion curves - a magnetizing field weaker than the mean anisotropy

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L 50963-65
ACCESSION NR: AP5011431

field. At frequencies of the order of 1 Mc (and lower) no distortion of the dispersion curves due to resonance absorption by microdomains with metastable orientation of the magnetization was observed. Orig. art. has: 11 formulas, 6 figures, and 2 tables.

ASSOCIATION: Institut metallofiziki Akademii nauk UkrSSR(Institute of Metal Physics, Academy of Sciences UkrSSR)

SUBMITTED: 00 ENCL: 00 SUB CODE: EM, EC

NR REF SOV: 000 OTHER: 006

Card 3/3

L 50954-65 EWT(1)/EPA(s)-2/EWT(m)/EWP(w)/EWP(i)/EWA(d)/T/EWP(t)/EEC(b)-2/EWP(z)/EWP(b) Pt-7/Pi-4 IJP(c) JD/GG

ACCESSION NR: AP5011437 UR/0048/65/029/004/0591/0596

AUTHOR: Lesnik, A.G.; Levin, G.I.; Kaverina, S.N.

TITLE: Influence of irregularities of the substrate surface on the coercive force of Permalloy films /Report, Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held in Irkutsk, 10-15 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 4, 1965, 591-596

TOPIC TAGS: ferromagnetic thin film, magnetic anisotropy, magnetic property, permalloy

ABSTRACT: It is a familiar fact that irregularities of the substrate surface (roughness, etc.) affect the properties of films deposited on such substrates, but despite the obvious importance of this factor as regards fabrication of films with consistent properties, the nature of the effect and its regularities have not been adequately studies. Accordingly, the purpose of the present work was to clarify the mechanism of the influence of substrate surface irregularities on one property of Permalloy films, namely, the coercive force. The films of 82% Ni + 18% Fe alloy were deposited in a vacuum of about $10^{-5}$ mm Hg onto glass (microscopic cover glasses) substrates heated to 250° in the presence of a 100 Oe field. The deposition rate

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L 50954-65

ACCESSION NR: AP5011437 0

was 30-40 Å/sec. The final films were all 800 to 1000 Å thick. Thus, the only varies parameter was the roughness of the glass substrate surface; this was varied in the range of irregularities from 200 to 2000 Å by preliminary coating of the glass with a film of silicon monoxide or aluminum several thousand angstroms thick. The degree of roughness was determined from the size of the film crystallites, gauged from replica electron micrographs. It was found that the film structure (crystallite size) is consistent with the degree of roughness. Films deposited on relatively smooth substrates (200-500 Å irregularities) had a relatively low coercive force, pronounced anisotropy and a more or less rectangular hysteresis loop. With increase of the roughness the coercive force increased, the anisotropy was smoothed out and the loop deviated from rectangularity. The experimental results are presented in figures. An attempt is made to explain the roughness dependence of the coercive force on the basis of theoretical considerations. The inferred regularities and relationships are qualitatively consistent with the experimental results. The deduction is that the irregularities affect or determine the size of the domains, and this, as in the case of variation in film thickness, determines the coercive force, anisotropy, and other magnetic properties. Orig. art. has: 11 formulas and 3 figures.

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L 50954-65

ACCESSION NR: AP5011437

ASSOCIATION: Institut metallofiziki Akademii nauk UkrSSR(Institute of Metal Physics, Academy of Sciences, UkrSSR)

SUBMITTED: 00 ENCL: 00 SUB CODE: EM

NR REF SOV: 000 OTHER: 003

Card 3/3

L 50953-65 EWT(1)/EPA(s)-2/EWT(m)/EWP(i)/EWA(d)/T/EWP(t)/EEC(b)-2/EWP(z)/EWP(b)
Pt-7/Pi-4 LJP(c) JD/HW/GG

ACCESSION NR: AP5011442 UR/0048/65/029/004/0615/0616

AUTHOR: Pushkar', V.N.; Zaychuk, O. A.; Lesnik, A. G.

TITLE: Electron microscopic study of the domain structure of Permalloy films with different dispersion of the anisotropy axis /Report, Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held in Irkutsk 10-15 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 4, 1965, 615-616, and insert facing p. 616

TOPIC TAGS: ferromagnetic thin film, magnetic anisotropy, domain structure, permalloy

ABSTRACT: In the present work there were studied, by means of a Tesla electron microscope, 81% Ni 19% Fe permalloy films with different degrees of dispersion of the magnetic anisotropy for the purpose of determining the domain structure associated with poorly pronounced anisotropy. To reduce the effect of the objective lens field the specimens were displaced some 5-7 mm from the focal plane of the objective. Five electron micrographs are reproduced. It was found that films with a dispersion of up to 13° have the domain structure characteristic of "good" films, i.e., in the demagnetized state a domain structure consisting of regular parallel domains sep-

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L 50953-65

ACCESSION NR: AP5011442

arated by 180° walls. Upon application of a reversing field in the easy direction the film switches by wall displacement; upon application of the field in the hard direction, the switching process starts with reversible rotation. Observation of films with poorly pronounced anisotropy revealed complete absence of 180° walls. Instead there is seen in the microscope image a pattern consisting of intersections of only dark, only light or light and dark lines (walls). The walls are crossed by short lines, generally dark on light walls and vice versa; these are single curving lines indicative of Neel walls with opposite magnetization of neighboring sections. At some distance from the walls there appear light or dark spots, indicative of small regions of contrary magnetization. The observations show that in films with poorly pronounced anisotropy the predominant switching mechanism is incoherent rotation of the magnetization vectors of individual microdomains; there is virtually no irreversible wall motion. Orig. art. has: 3 figures.

ASSOCIATION: Institut metallofiziki Akademii nauk UkrSSR(Institute of Metal Physics, Academy of Sciences UkrSSR)

SUBMITTED: 00/—Apr65 ENCL: 00 SUB CODE: EM

NR REF SOV: 001 OTHER: 002

Card 2/3

ACC NR: AT6020705 (N) SOURCE CODE: UR/0000/65/000/000/0071/0083

AUTHOR: Lesnik, A. G.; Sandler, L. M.

ORG: Institute of Metal Physics AN UkrSSR (Institut metallofiziki AN UkrSSR)

TITLE: Investigation of the influence of tensile stresses on the coercive force and the anisotropy field of permalloy films

SOURCE: AN UkrSSR. Fizika metallicheskikh plenok (Physics of metal films). Kiev, Naukova dumka, 1965, 71-83

TOPIC TAGS: magnetic thin film, permalloy, magnetic anisotropy, magnetic coercive force, magnetic domain structure, ferromagnetic resonance, tensile stress

ABSTRACT: The purpose of the investigation was to check experimentally some of the published theoretical hypotheses concerning the relation between the coercive force of a thin permalloy film and the dimensions of its domain boundaries as well as the properties of the substrate, as manifest by the effect of tensile stresses on the properties of the film and on the amplitude dispersion of the anisotropy field. To this end, the authors measured the corecive force, the mean value of the anisotropy field, the rms angular dispersion of the anisotropy field, and the rms amplitude dispersion of the anisotropy field of 24 films, using ferromagnetic-resonance apparatus and a procedure described in a preceding article in the same source (p. 59). Plots of the measured quantities against the applied stress were obtained for all films. The results show that at low stresses the prevailing hypotheses agree with the hither-

Card 1/2

L 47702-66

ACC NR: AT6020705

to assumed linearity of the coercive force in the applied tensile stress, but with increasing stress the linearity disappears, and the deviation is interpreted from the point of view of changes occurring in the domain structure of the film and the dispersion of the anisotropy field. The latter may be affected by mechanical or chemical inhomogeneities. The observed changes in the heights of the dispersion curves and the size of the area under them with increasing stress can not be fully explained at present and calls for additional research. Orig. art. has: 7 figures and 6 formulas.

SUB CODE: 20/ SUBM DATE: 15Dec64/ ORIG REF: 004/ OTH REF: 002

Card 2/2 cv

L 07459-67 EWT(m)/EWP(k)/EWP(t)/ETI IJP(c) JD/WW/HW/JG

ACC NR: AP6034755 SOURCE CODE: UR/0020/66/170/005/1059/1061

AUTHOR: Lesnik, A. G.

ORG: Institute of Metal Physics, Academy of Sciences, UkrSSR (Institut metallofiziki Akademii nauk UkrSSR)

TITLE: Concerning one necessary condition for the vaporization of a metal wire by exploding it with current

SOURCE: AN SSSR. Doklady, v. 170, no. 5, 1966, 1059-1061

TOPIC TAGS: exploding wire, copper, electric discharge, magnetic pinch, critical pressure, critical temperature, vaporization

ABSTRACT: The author points out that since no homogeneous vapor can be produced from a wire if the explosion product constitutes a mixture of vapor and liquid, one of the conditions that must be fulfilled during the explosion is that both the temperature and pressure exceed their critical values at the instant of the explosion. In the case of copper wire this pressure must therefore exceed $10^4$ atm and the temperature $10^4$ deg. In spite of these high values, they can be realized in experiments by making use of the pinch effect. A differential equation relating the electric charge that must be fed to the wire, the inductance of the discharge circuit, the magnetic pressure, the wire temperature, and other parameters is formulated, and the results of its computer solution (the electric current, the magnetic pressure, and the temperature of the wire as functions of the time elapsed since the explosion of the wire) are

Card 1/2 UDC: 536.422.1: 537.529

L 07459-67

ACC NR: AP6034755

reported and discussed. The magnetic pressure produced was found to depend strongly on the wire diameter but not on its length. Critical pressure is attained for wires with diameters 0.02—0.12 cm at relatively low temperatures. The optimal wire diameter is estimated at 0.045 cm, and wires thicker than 0.13 cm are not suitable for experiments of this type. On the other hand, wires that are too thin produce too small a pinch effect. It is pointed out that the numerical values obtained apply only to the discharge-circuit parameters used in the present experiments, and that tests with other equipment will yield different optimal values. The present results merely prove the existence of optimal wire diameters. This report was presented by Academician G. V. Kurdyumov 14 January 1966. Orig. art. has: 3 figures.

SUB CODE: 20/ SUBM DATE: 17Dec65/ ORIG REF: 001/ OTH REF: 002
ATD PRESS: 5104

Card 2/2 Lgm

EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6029131 SOURCE CODE: UR/0048/66/030/006/1050/1054

AUTHOR: Lesnik, A.G.; Nodostup, V.M.; Levin, G.I.

ORG: none

TITLE: On the role played by vacancies and dislocated atoms in induced anisotropy [Report, All-Union Conference on the Physics of Ferro- and Antiferromagnetism held 2-7 July 1965 in Sverdlovsk]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 6, 1966, 1050-1054

TOPIC TAGS: ferromagnetic film, permalloy, magnetic anisotropy, annealing, lattice defect, kinetic theory

ABSTRACT: The authors have investigated the magnetic anisotropy of approximately 1000 Å thick permalloy films vacuum deposited at $3 \times 10^{-5}$ mm Hg from a 17.5Fe-82.5Ni melt at about 40 Å/sec onto heated (20 to 200°) glass substrates and annealed at different temperatures and for different lengths of time in a 100 Oe field. Curves were plotted giving the magnetic anisotropy as a function of duration of anneal for films that were deposited on substrates maintained at a given temperature during deposition and were annealed at a (generally different) given temperature. Two of these curves are presented. The curves had different shapes, depending on the parameters (substrate and annealing temperatures): some rose monotonically with increasing annealing time toward a limiting value of the magnetic anisotropy, some fell monotonically, and

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L 08764-67
ACC NR: AP6029131

others (including the two presented in the paper) decreased to a minimum and then rose toward the initial value of the anisotropy. It is hypothesized that induced magnetic anisotropy is due mainly to the influence of lattice defects, and data in the literature are adduced in support of this hypothesis. A simple kinetic theory of the magnetic anneal of the films is developed on the assumption that the anisotropy is due to ordered chains of vacancies and that during the anneal the number of ordered vacancies can increase as a result of ordering of initially disordered vacancies and can decrease as a result of annihilation of vacancies with dislocated atoms. The results of this theory were compared with the experimental curves and good agreement was found; it is concluded that ordered vacancies are mainly responsible for the induced magnetic anisotropy in the investigated films. The activation energies for the ordering and annihilation processes were found to be 27 and 18.7 kilocal/gram-atom, respectively. The processes taking place during the anneal were found to take place least rapidly in the films that were deposited on 100° C substrates. The greater rapidity of the anneal processes in films deposited on colder substrates is ascribed to the effect of greater mechanical stresses in those films; the reason for the greater rapidity of the anneal processes in the films deposited on hotter substrates is not understood. The authors expect to investigate in the future the effects of impurities and film deposition rate on the kinetics of magnetic anisotropy induction. Orig. art. has: 9 formulas and 1 figure.

SUB CODE: 20 SUBM DATE: 00 ORIG. REF: 001 OTH REF: 008

Card 2/2 bc

ACC NR: AP7004754 SOURCE CODE: UR/0413/67/000/001/0049/0049

INVENTOR: Lesnik, A. G.; Levin, G. I.

ORG: none

TITLE: Method of producing ferromagnetic films. Class 12, No. 189952 [announced by the Institute of Metal Physics, AN UkrSSR (Institut metallofiziki AN Ukrssr)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 1, 1967, 49

TOPIC TAGS: ferromagnetic film, ~~ferromagnetic film~~ vacuum deposition, ferromagnetic material, metal deposition, varnish, heat resistant material

ABSTRACT: This Author Certificate introduces a method of vacuum deposition of ferromagnetic films in a magnetic field on a substrate precoated with a sublayer. To increase the coercive force of films and facilitate the control of film parameters, the sublayer is made of heat-resistant, organosilicon varnish which is vacuum-heat treated prior to the deposition of ferromagnetic material. [ND]

SUB CODE: 13,11,20/ SUBM DATE: 09Nov65/ ATD PRESS: 5117

Card 1/1 UDC: 621.318.132.002.2

KAARLE, I.A., prof.; KHERUVIMOV, V.P.; SEVRUK, O.; LUZYANIN, L.; LESNIK, E.; POTAPOV, V.M.; SIKORSKIY, A.N.

Brief news. Veterinariia 41 no.6:122-125 Je '64. (MIRA 18:6)

ALBU, T. (Rumyniya); BYRNAURS, T. (Rumyniya); TSYBRYA, S. (Rumyniya); RUSSU, V. (Rumyniya); LESNIK, E.Kh. [translator]

Active immunity against hog cholera. Veterinariia 42 no.9:108 S '65. (MIRA 18:11)

3720

S/035/62/000/005/035/098
A055/A101

3.1720

AUTHORS: Ikhsanova, V. N., Lesnik, G. E.

TITLE: Some results of the observations of the two-dimensional distribution of the radio brightness over the solar disk on the 3.15-cm wavelength

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 5, 1962, 42, abstract 5A324 ("Solnechnyye dannyye", 1961, no. 1, 66-69)

TEXT: The authors set forth the observations of the Sun at the azimuths $\pm 40^{\circ}$ with the aid of the great Pulkovo radio telescope, for 26 days in July - August 1960. They point out the fact that, in azimuthal observations, it is possible to predict with certainty (for 24 hours) the emergence of active formations on the eastern edge of the solar disk and to determine the position of the center of the active region with a precision to within a few degrees. Twelve correct predictions were made during the observations.

N. Soboleva

[Abstracter's note: Complete translation]

Card 1/1

39627
S/194/62/000/004/033/105
D271/D308

4,1540

AUTHORS: Ikhsanova, V. N. and Lesnik, G. E.

TITLE: Some results of observations of two-dimensional distribution of radio-brilliance on the solar disc, at a wavelength of 3.15 cm

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 4, 1962, abstract 4zh273 (Solnechnyye dannyye, 1961, no. 1, 66-69)

TEXT: Results are given of observations by the Bol'shoye Pulkovo radio-telescope, in the period of 26 days in July and August, 1960, in the azimuth range of + 40°. It is pointed out that such observations can reliably predict active formations on the Eastern edge of the solar disc, 24 hours in advance, and the center of active range can be determined with an accuracy of a few degrees. During the period of observations, 12 correct predictions were made. [Abstracter's note: Complete translation.]

Card 1/1

LESNIK, Ivan, dipl. inz. el. (Maribor, Heroja Tomsica 11)

Automated operation of carding machines. Pt.2. Avtomatika 5 no.4:313-319 '64.

LESNIK, Ivan, dipl. inz. el.

Automatized operation of carding machines. Pt.1. Automatika 5 no.3:199-203 '64

1. Enterprise for Electric Industries and General Assembling, Maribor.

LESNIK, N. D.

27(4E2c)

The reaction of titanium carbide with cobalt. V. N. Eremenko and N. D. Lesnik. *Voprosy Poroshkovoi Met. i Prochnosti Materialov, Akad. Nauk Ukr. S.S.R.* 1956, No: 6 3, 73–80.—The system TiC–Co was studied by means of thermal and metallographic analysis, and by hardness and microhardness measurements in the concn. range 0–17.2% TiC. The eutectic mixt. (at 1360°) contains 6.0% TiC. The Co-rich solid soln. at 1360° contains 1.0% TiC. At 700° this concn. is reduced to 0.15%. TiC dissolved in Co appears to stabilize the cubic modification of Co.

C. H. Fuchsman

YEREMENKO, V.N. LESNIK, N.D.

"The Interaction of Titanium Carbide With Cobalt", from the monograph Questions on Power Metallurgy and the Strength of Materials, No III, Institute of Metalloceramics and Special Alloys, Academy of Sciences Ukrainian SSR, Kiev, 1956, 145 pages

Sum. 1287

33804
S/137/62/000/001/059/237
A060/A101

1.1600
15

AUTHORS: Yeremenko, V. N., Lesnik, N. D.

TITLE: On saturating porous titanium carbide with cobalt, nickel, and their alloys with copper

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 1, 1962, 39, abstract 10294 ("Poroshk. metallurgiya", 1961, no. 1, 43-49, English summary)

TEXT: TiC ingots fabricated by sintering freely poured powders at 1,500°C in vacuum, were saturated at high vacuum of $\sim 10^{-5}$ mm Hg by Ni, Co and their Cu-alloys. Pure nickel and cobalt react very vigorously with TiC and it is impossible to carry out the saturation in practice; by the use of saturated solutions of Ni and Co with TiC the saturation of porous billets proceeded safely, but so rapidly that it was not possible to study the laws of kinetics. Only with the use of alloys of Cu - (15-20%) Ni (Co) did one manage to plot the saturation isotherms, which confirmed the parabolic dependence. The saturation activation energy was estimated. It is noted that the limiting process of the saturation is, in the majority of cases, not the viscous flow of the molten metal, but its spreading over the surface of the solid framework. R. Andriyevskiy
[Abstracter's note: Complete translation]

Card 1/1

30895
S/180/61/000/005/005/018
E111/E135

15.2400

AUTHORS: Yeremenko, V.N., and Lesnik, N.D. (Kiyev)

TITLE: Kinetics of the impregnation of porous iron and nickel with liquid lead and silver

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, no.5, 1961, 43-50

TEXT: Impregnation of porous solids with liquid metals is widely applied in cermet production. In the present investigation an attempt is made to find the influence of temperature, extent of porosity and pore size on the kinetics of impregnation in systems in which no interaction occurs (Fe-Pb, Fe-Ag) and with limited solubility of the porous metal in the impregnating liquid (Ni-Pb, Ni-Ag). The latter conditions were interesting in that the decrease in free energy on impregnation was made up of wetting-energy effects (as in the former conditions) and of energy of mixing when the solution is formed. The apparatus used is shown in Fig.1. (1 - quartz reaction-vessel; 2 - water-cooled brass cap; 3 - device for vertical movement of the specimen;

Card 1/ 04

Kinetics of the impregnation of ...

5 - quartz-sheathed thermocouple; 5 - porous sample; 6 - crucible with molten metal; 7 - ceramic cylinder with a heater; 8 - nickel and molybdenum screens; 9 - magnesite support for resistance furnace; 10 - electric leads). The rate of penetration was found from the rate of the weight increase of the specimen, experiments having shown that the penetration front was a practically straight surface perpendicular to the direction of penetration. The specimens were made from powders; electrolytic iron powder was annealed at 800-900 °C for 90 minutes in hydrogen and then screened; grade HT-1 (NP-1) nickel powder was used. Sintering was carried out on freely poured powders in quartz tubes, at temperatures and pressures depending on the size grading. For studying the effect of temperature on penetration rate 67-69% porosity specimens were used. Nickel specimens had 62-64% porosity. For impregnation, 99.99% Ag silver and "analytical" purity lead were used, the latter being melted and repeatedly filtered under vacuum before use. The results were found to be satisfactorily represented by.

$$(\Delta m/D^2)^2 = K\tau \qquad (1)$$

Card 2/04

Kinetics of the impregnation of ...

where: $\Delta m$ is the weight gain of the specimen; $\tau$ is impregnation time; D is the diameter. From the temperature effect the activation energy was found to be 43 kcal/g.atom for iron-lead, and 93 for iron-silver. The work showed that the rate of impregnation increases with increasing pore size and with increasing extent of porosity if the grain size of the powder is maintained. Because of the very rapid impregnation of the porous solid the rate of impregnation by pure metal and saturated solution is the same. Comparison of the activation energy of the impregnation process with that of the viscous flow of the penetrating liquid showed substantial differences, the values differ for the impregnation of different solids with a given liquid. On the basis of this and the variation of wetting angles with temperature the authors propose that the controlling factor in the impregnation of porous iron and nickel with liquid lead and silver is not viscous flow of the liquid in capillaries but the spread over the solid surface.
There are 7 figures, 4 tables and 7 references: 1 Soviet-bloc, 1 Russian translation from non-Soviet publication, 4 English and

Card 3/0 4

Kinetics of the impregnation of .... 36895 S/180/61/000/005/005/018 E111/E135

1 German. The English language references read as follows:

Ref.2: E.W. Washburn. Dynamics of the capillary flow. Phys. Rev., 1921, 7 (3), 273.

Ref.3: K.A. Semlak, S.W. Spenser, F.H. Rhines. Rate of capillary rise of liquid metal in a higher melting metal powder compect. J. Metals, 1957, 9 (1/2), 63.

Ref.6: H.J. Fisher, A. Phillips. Metals, 1954, 6 (9), 1060. Viscosity and density of liquid lead-T, U and antimony-cadmium alloys.

Ref.7: K.A. Semlak, F.N. Rhines. The rate of infiltration of metals. Trans. Met. Soc., AIME, 1958, 212 (3), 325.

ASSOCIATION: Gosudarstvennyy universitet im. T.G. Shevchenko (State University imeni T.G. Shevchenko) Institut metallokeramiki i spetssplavov, AN USSR (Institute of Powder Metallurgy and Special Alloys, AS Ukr.SSR)

SUBMITTED: July 14, 1960

Card 4/4

L 57533-65 EWP(e)/EPA(s)-2/EWT(m)/EPF(c)/EPF(n)-2/FCS(f)/T/EWP(t)/EWP(k)/EPA(bb)-2/EWP(z)/EWP(b) Pf-4/Pr-4/Pad/Pt-7/Pu-4 IJP(c) JD/HW/JG/DJ

ACCESSION NR: AR5015173 UR/0137/65/000/005/0039/0039

SOURCE: Ref. zh. Metallurgiya, Abs. 50235

AUTHOR: Yeremenko, V. N.; Lesnik, N. D.

TITLE: Investigation of the possibility of using metalloceramic sealers with a low melting liquid filler for vacuum systems

CITED SOURCE: Tr. 7 Vses. nauchno-tekhn. konferentsii po poroshk. metallurgii. Yerevan, 1964, 207-213

TOPIC TAGS: metal ceramic material, sealing, vacuum seal, valve, powder metal

TRANSLATION: The article presents the results of a determination of the possibility of using, as sealers in vacuum systems, valves made of porous metalloceramic packings produced from iron, nickel, copper, molybdenum, tungsten and stainless steel powders by impregnating them with alloy fillers with a melting point in the range of 400-650°. Samples for impregnation with a porosity of 67-70% were prepared by sintering free flowing powder in a vacuum or in hydrogen for 1 hr at 1100-1200°. The impregnation was carried out in a vacuum at 650-700° for 3-5 min. V. Shelamov.

Card 1/1 SUB CODE: MM ENCL: 00

T/EWP(t)/EWP(k)/EWP(b) Pab-10/Pf-4/Pr-4/Ps-4/Pt-10/Pu-4 IJP(c)

ACCESSION NR: AP5008270 WH 8/0226/65/000/003/0020/0021

AUTHOR: Lesnik, N. D.

TITLE: Poreless high hardness materials obtained by impregnation

SOURCE: Poroshkovaya metallurgiya, no. 3, 1965, 20-21

TOPIC TAGS: cermet, titanium carbide base cermet, high hardness cermet, roll bearing, high temperature bearing

ABSTRACT: A method of producing poreless carbide-base material by impregnation of porous titanium-carbide specimens (obtained by sintering loose carbide powder in graphite molds) with molten nichrome in a vacuum of 2.6—6.6 kn/m$^2$ at 1350C has been tested. Dense material, almost without signs of porosity, with a uniform distribution of nichrome and a hardness of 76—78 $R_A$ was obtained. The hardness can be raised to 84—85 $R_A$ if the porosity of sintered titanium carbide is reduced from 36 to 16% by 1.5—2 min vibration of molds with powder with max 100 cps. Impregnated material was found to have a much higher dynamic strength than sintered material. Therefore, it can be successfully used for wear-resistant structural parts, particularly for roll bearings operating at high temperatures. Orig. art. has: 1 figure. [ND]

Card 1/2

L 37637-65
ACCESSION NR: AP5008270

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Institute of Material Study, AN UkrSSR)

SUBMITTED: 10Mar64 ENCL: 00 SUB CODE: MT,MM

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Card 2/2

NOZDRYUKHIN, V.K.; KREYTER, A.A.; KLYAVIN, V.; KLIZOV, I.; SUSLOV, V.F.; PAK, V.A., kand. geol.-min. nauk; YAKOVLEV, V.N.; LESNIK, Yu.N.; KOMOLEV, I.A.; RACHKULIK, V.I.; TACHKOVA, N.A.; KOLESNIKOVA, V.N., kand. fiz.-mat. nauk; NASYROV, M.; SHUL'TS, V.L., doktor geolgr. nauk, prof., otv. red.; GAYSINSKAYA, I., red.; MAMANIFOVA,D., red.; GOR'KOVAYA, Z.P., tekhn. red.

[Fedchenko Glacier]Lednik Fedchenko. Tashkent, Izd-vo Akad. nauk Uzbekskoi SSR. Vol.1. 1962. 247 p. (MIRA 15:8)

1. Akademiya nauk Uzbekskoy SSR, Tashkent. Institut matematiki.
(Fedchenko Glacier)

LESNIKOV, A.I., inzh.

Improve the work of departments for the organization of labor and wages in mines. Ugol' Ukr. 10 no. 1:42 Ja '66.
(MIRA 18:12)

LESNIKOV, A.L.; IVANOVA, M.G.

Occupational contact method of transmission of anicteric leptospirosis among packing house workers; author's abstract. Zhur. mikrobiol.epid. i immun. 29 no.2:137-138 F '58. (MIRA 11:4)

1. Iz kafedry infektsionnykh bolezney I Leningradskogo meditsinskogo instituta imeni Pavlova i Gorodskoy infektsionnoy bol'nitsy imeni Botkina.
(LEPTOSPIROSIS) (PACKING HOUSE WORKERS--DISEASES AND HYGIENE)

LESNIKOV, A.L.

Clinical and epidemiological peculiarities of leptospirosis diseases. Vrach.delo no.9:977-978 S '59. (MIRA 13:2)

1. Kafedra infektsionnykh bolezney (zaveduyushchiy kafedroy - N.V. Chernov) Pervogo Leningradskogo meditsinskogo instituta i Leningradskaya infektsionnaya bol'nitsa imeni S.P. Botkina.
(LEPTOSPIROSIS)

LESNIKOV, A.L.

Clinical aspects of nonicteric forms of Valil'ev-Weil's disease as revealed by data from the S.P. Botkin Hospital in Leningrad for 1954-1958 Je '60. (MIRA 13:9)

1. Iz kafedry infektsionnykh bolezney (zav. - doktor medsinskikh nauk B.L. Ittsikson) I Leningradskogo meditsinskogo instituta imeni I.P. Pavlova i Leningradskoy gorodskoy infektsionnoy bol'nitsy imeni S.P. Botkina (glavnyy vrach M.M. Figurina).
(WEIL'S DISEASE)

POPOVA, Ye.M.; LESNIKOV, A.L.

Active detection of zoonose among workmen of food establishments. Trudy Len.inst.epid.i mikrobiol. 20:157-165 '59. (MIRA 16:1)

1. Iz laboratorii osobo opasnykh infektsiy i rikketsiozov Leningradskogo instituta imeni Pastera i kafedry infekstionnykh bolezney I Leningradskogo meditsinskogo instituta - zav. kafedroy dotsent N.V.Chernov.
(ZOONOSES) (FOOD INDUSTRY--HYGIENIC ASPECTS)

POPOVA, Ye.M.; LESNIKOV, A.L.

Leptospirosis infection among the workers of swine farms. Trudy Len.inst.epid.i mikrobiol. 23:234-242 '61. (MIRA 16:3)

1. Iz laboratorii osobo opasnykh infektsiy i rikketsiozov Leningradskogo instituta epidemiologii i mikrobiologii imeni Pastera i kafedry infektsionnykh bolezney I Leningradskogo meditsinskogo instituta.
(LEPTOSPIROSIS) (SWINE AS CARRIERS OF DISEASE)

LESNIKOV, A.L.; POPOVA, Ye.M.

Leptospiral diseases complicated by meningitis. Trudy Len. inst. epid. i mikrobiol. 25:293-304 '63.

Leptospirosis of the Tarabov type. Ibid.:305-312
(MIRA 17:1)

1. Iz otdela osobo opasnykh infektsiy Leningradskogo instituta epidemiologii i mikrobiologii imeni Pastera i kafedry infektsionnykh bolezney 1-go Leningradskogo meditsinskogo instituta imeni akademika Pavlova.

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AUTHORS: Gavrilov, B. G., Gulin, Ye. I., Lesnikov, A. P., Tarasov, A. K.

TITLE: Preignition Conversion of Methane Hydrocarbons in Internal Combustion Engines

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, Nr 2, pp 421-424 (USSR)

ABSTRACT: The preignition conversion of paraffins (n-hexane, n-heptane, n-octane, 2,3-dimethylpentane, 2,2,3-trimethylbutane, and 2,2,4-trimethylpentane) were investigated in a one-cylinder Waukesha engine with adjustable compression ratio. The engine was heated up by running normally on B-70 gasoline; the ignition and the gasoline supply was then cut off and the flywheel turned by an electric motor until a predetermined upper temperature was reached. The supply of the investigated hydrocarbon was then turned on, the gaseous mixture of the hydrocarbons with air was aspired into the cylinder,

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Preignition Conversion of Metnane Hydrocarbons in Internal Combustion Engines

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compressed without ignition, and expelled into a large, water- or dry ice-cooled flask. The tests were made at 1,000 rpm, 110° temperature of the gaseous mixture, and only a 4.33 compression ratio to avoid the self-detonation of the mixture. The analysis of the compression products showed that the chief process occurring in from 150 to 300° C and 250 to 400° C was the thermal decomposition of the molecules and the formation of unsaturated hydrocarbons. Branched hydrocarbons showed higher stability of the molecular structure than the normal hydrocarbons. The rate of molecule decomposition was in direct ratio to the amount of the hydroperoxides formed and the total oxidizability of the hydrocarbons. The insignificant amount of the hydrocarbon conversion (about 1%) during the 0.015 sec time of the compression cycle determines, nevertheless, the direction and character of the fuel combustion in the in the engine. There are 2 tables; and 5 references,

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Preignition Conversion of Methane Hydrocarbons in Internal Combustion Engines

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2 U.S., 1 U.K., 5 Soviet. The U.S. and U.K. references are: A. Fallah, R. Long, F. Garner, Fuel, 1, 4 (1952); A. Pahnke, P. Cohen, B. Sturgis, Ind. Eng. Chem., 46, 5, 1024 (1954); G. Lappin, Anal. Chem., 23, [illegible] (1951).

ASSOCIATION: A. A. Zhdanov Leningrad State University (Leningradskiy gosudarstvennyy universitet imeni A. A. Zhdanova)

SUBMITTED: July 8, 1959

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AUTHORS: Bychkova, M. K., Gavrilov, B. G., Gulin, Ye. I. and Lesnikov, A. P.

TITLE: Pre-flame conversion of hydrocarbons in diesel engines at the critical stages of compression

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 4, 1962, 892-896

TEXT: The authors investigated pre-flame reactions in compression ignition engines. The following fuels were used: ГВ (GV)-vacuum gas oil, ЛКГ (LKG)-light catalytic gas oil, ДС (DS)-special diesel fuel, ТС-1 (TS-1) fuel for reaction engines, ДЛ (DL)-summer diesel fuel, ИМН (IMN)-isomethane-naphthene hydrocarbons, n-cetane, α-methyl naphthalene, undecane and dodecane. The experiments were conducted in a standard engine ИТ9-3 (IT9-3). Samples of condensed gases from the combustion chamber were extracted into a Bunsen flask attached to a side tube fixed to the exhaust pipe. The condensate was analyzed for unsaturated and oxygen-containing compounds of all types. In all experiments the main pre-flame conversion process was the

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destruction of hydrocarbon molecules under the influence of heat of compression, accompanied by the formation of unsaturated hydrocarbons. The final conversion depended on the hydrocarbon composition of the fuels and in particular on their content of normal hydrocarbons. Isomethane-naphthene hydrocarbons were converted to a much smaller extent than the normal hydrocarbons. The latter gave a large quantity of unsaturated compounds and oxidation products at relatively small degrees of compression and low temperatures. Exceptional stability was shown by $\alpha$-methyl naphthalene. For the normal hydrocarbons the stability decreased with their molecular weight. For all fuels the conversion reactions took place in the gaseous phase. In the pre-flame period the degree of fuel conversion was directly proportional to its vapor pressure in the combustion chamber. There are 1 table and 13 references: 8 Soviet-bloc and 5 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: E. Retaillian, M. Richerds and C. Jones, Am. Scient., 39, 656, (1951); M. Corzilius, D. Dugge and D. Pastell, S. A. E., 61 (1953); P. Garner, Fuel, 25, (1953); M. Eliot, [illegible]

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R. Davis and R. Friedel, III World Petroleum Congress, Section VII, (1951).

SUBMITTED: November 1, 1960

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GAVRILOV, B.G.; GULIN, Ye.I.; LESNIKOV, A.P.; NOVIKOVA, T.A.

Chemical principles of the thermoforcing of a diesel engine.
Zhur. prikl. khim. 36 no.11:2498-2502 N '63.
(MIRA 17:1)

LESNIKOV, L.A.; MATVEYEVA, R.P.

Nature of the effect of waters discharged by the Volga River on the zooplankton of the Northern Caspian. Trudy VNIRO 38:176-203 '59. (MIRA 13:4)

(Caspian Sea--Zooplankton)

LESNIKOV, M.

All workers fulfill their work norms. Prom.koop. no.10:4 O '57.
(MIRA 10:12)

1.Predsedatel' pravleniya arteli "Remstroitel'," Astrakhan'.
(Astrakhan--Construction industry)

SELYUTIN, V.; LESNIKOV, N.; RAYEVICH, V.; GUREVICH, V.; KRAVTSEV, A. (Bryansk); REVUNOV, M. (g. Ramenskoye, Moskovskoy oblasti); NAZAROV, P.; RYKOV, Yu.; MIN, A.; IGNATENKO, N.

Letters on various subjects. Mest. prom. i khud. promys. 3 no.8:30-31 Ag '62. (MIRA 15:10)

1. Starshiy inzhener Glavbelmostproma, g. Minsk (for Selyutin).
2. Glavnyy inzhener shveynogo kombinata "Pobeda", g. Ulan-Ude (for Gurevich).

(Industries)

BARABOLYA, P.D., polkovnik yustitsii; LESNIKOV, N.D.

New instructions on border protection for the U.S.S.R. Mor.sbor. 44 no.2:11-19 F '61. (MIRA 14:4)
(Russia—Boundaries) (Border guard)

LESNIKOV, V., inzhener.

Astronger link between schools of mechanization and the machine--tractor stations. Prof.-tekh.obr. 13 no.5:11-12 My '56.
(MLRA 9:8)

1. Moskovskoye oblastnoye upravleniye trudovykh rezervov.
(Moscow Province--Farm mechanization--Study and teaching)
(Moscow Province--Machine-tractor stations)

AUTHOR: Lesnikov, V., Senior Engineer

TITLE: Practical Training in the Kolkhozes (Proizvodstvennaya p: [illegible] kh v Kolkhozakh)

PERIODICAL: Professional'no-tekhnicheskoye obrazovaniye, 1958, Nr [illegible], pp 23-24 (USSR)

ABSTRACT: Instruction on the operation of agricultural machines is the most difficult subject in the training of machine operators. The author relates how the schools of mechanization in the Moscow Oblast' handle this matter. He emphasizes the importance of performing the agricultural training right in the field since the schools now have training farms at their disposal. The students must carry out the work by advanced agricultural methods and work independently. The author describes how the Mozhayskoye uchilishche mekhanizatsii Nr 15 Moskovskoy oblasti (Mozhaysk School of Mechanization Nr 15, Moscow Oblast') is coping with the task of practical agricultural training at the training farms of 2 kolkhozes. Speaking of the students of the Remeslennoye uchilishche po mekhanizatsii sel'skogo khozyaystva Nr 52 (Trade School for Agricultural Mechanization Nr 52) at Chekhov, Moscow Oblast', he states that they passed their practical training on a

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Practical Training in the Kolkhozes

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training farm at a kolkhoz attached to the school and at the sovkhozes of the oblast'. The author lists the various tasks performed by 1,500 students, 774 of whom worked independently. He outlines how practical training was previously conducted, pointing out that now, after the reorganization of the MTS, it will proceed much better. He recommends the conclusion of a contract between the school and the kolkhoz for the work to be carried out and mentions the students' work diary, serving as proof of their practical training.

ASSOCIATION: Moskovskoy oblastnoye upravleniye trudovykh rezervov (Moscow Oblast' Administration of Labor Reserves)

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LESNIKOV, V.; TSAR'KOV, A.

Optimal size of aerial farms. Mekh. sel'khoz. 15 no.1:44-48 Ja '65.

LESNIKOV, V.

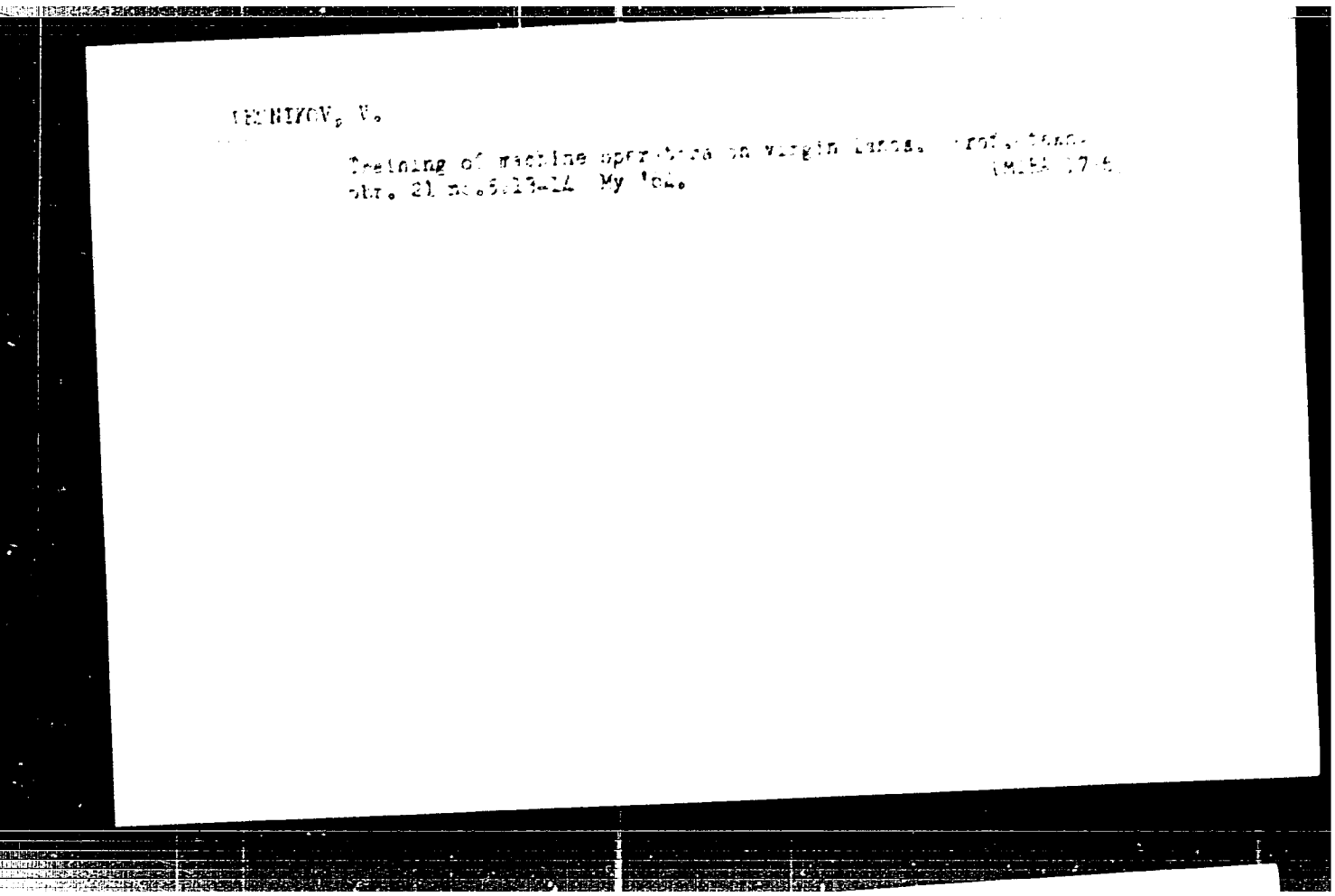
We need a permanent staff of operators. Prof.-tekh.obr. 20 no.11:15-16 N '63. (MIRA 17:1)

1. Zamestitel' direktora TSentral'nogo uchebno-metodicheskogo kabineta.

LESNIKOV, V.

Progressive technology should serve as the training basis for machine operators. Prof.-tekh.obr. 18 no.11:17-19 N '61. (MIRA 14:11)

1. Zaveduyushchiy laboratoriyey mekhanizatsii sel'skogo khozyaystva Tsentral'nogo uchebno-metodicheskogo kabineta.
(Farm mechanization—Study and teaching)



ZENKOV, V.

Training of machine operators on virgin lands. Prof.-tekh. (MLRA 17:6)
obr. 21 no.5:13-14 My '63.

SMIRNOV, I.; LESNIKOV, V.

Branches of farm mechanization schools. Prof.-tekhn.obr. 19 no.11:3-4 N '62. (MIRA 16:2)

1. Nachal'nik TSelinnogo krayevogo upravleniya professional'no-tekhnicheskogo obrazovaniya (for Smirnov).
(Farm mechanization—Study and teaching)

LESNIKOV, V.D., vettekhnik (Blagodarnenskiy rayon, Stavropol'skogo kraya).

Carbon tetrachloride and naphthalene in treating myiasis.
Veterinariia 35 no.8:70 Ag '58. (MIRA 11:9)
(Myiasis)

1. VASIL'YEV, A. P., LESNIKOV, V. V., ENG

2. USSR (600)

4. Reinforced Concrete Construction

7. Spot welding of supporting skeletons used as reinforcements for reinforced concrete construction. Eng. Stroi. prom. 30 no. 21, 1952.

9. Monthly List of Russian Accessions, Library of Congress, March 1953. Unclassified.